THE TUBE

FORMGIVING DISCOURSE - NOT FORM BECOMES NORM. THE MEDICAL VENTILATOR & THE NEGLECTED TUBE

INDUSTRIAL DESIGN MFA DEGREE PROJECT by CRISTINE SUNDBOM
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If form follows normative discourse in medical design, what happens to the gestalt when you include related discourses of the medical ventilator in the design process? My aim has been to integrate critical industrial design and with an exploratory aesthetic approach. This aesthetic approach aimed to create an ongoing exchange between the development of concepts inspired by theory and the creative sketching of 3-D form.

The medical ventilator can be divided in three parts: 1. The technical part of the machine, 2. The monitor with an interface, and 3. The tubes that is the connection to the patient. In the beginning of the project I was working with the part of the medical ventilator that connects to the patient, ie. the tubes. My methods at this point were conducting interviews with caretakers, filming nurses handling the tube and having informal discussions with doctors and nurses. Using my own embodied experience is also part of my method since I am a licensed vocational nurse with experience from the ICU ward.

I began my project by studying the part of the ventilator that connects to the patient. After I had been working with the project for some time I started to realize that what I was referring to as an important part of the medical ventilator, was just seen by others as a “tube”. I decided to change the roles, and to work only on the tube, and not on the rest of the apparatus. When I made this discourse shift, I tried to understand why the tube had been neglected in medical design. The tube is de facto an essential part of the ventilator. It is the important link between the patient and the apparatus, and without it, there is no treatment. Despite of this, the ventilator tube is not prioritised in medical design. I used gender theory about hierarchy of power and work division to understand this matter and concluded that the patient has low status in hospital care. Technical intensive care has high status, while patient related care as geriatric care has low status. In similar manner the hierarchy exists in the medical ventilator. The part of the product that contains the technology has high status, while the part that is low tech and connected to the patient, the ventilator tube, has low status.

My combined theoretical and explorative aesthetic approach didn’t only prove to change the gestalt, allowing for bodily form that challenges the constructed dichotomy of the hospital discourse. It also changed the entire focus on the product by making the tube central. It also inspired for a solution moving from a visual interface to a haptic and tactile interface. Some questions this design project attempts to discuss: What does it mean to give bodily form to this medical design project? How does the use of a tactility and haptics interface on a surface that may resemble a soft body help response from the staff and relatives as they encounter with the patient? In what way can the medical design process develop in a way to help patients regain humanity?
INTRODUCTION
BACKGROUND

Industrial design discourse can be described as coopted by market driven forces. "What happens when you look at design as something more than a service based relationship between client and designer? What new strategies and models help to question and challenge the limits of design?.... " It's important to let design be used and to progress with its own qualities and strengths, this is why I'm exploring the subject of a conservative field within design to uncover implicit norms and to reclaim design as a critical practice.

The reason why I chose to design a medical ventilator was that I was working at the medical intensive care ward at a hospital in Stockholm. I found the machine to be very interesting. It's a machine that literally connects to the human body. It also risen a greyzone of ethical matters concerning life and death.

The medical ventilator can be described to consist of three parts 1.MONITOR 2. MACHINE 3. TUBES. My starting point was to design the whole product without medical ventilator didn't make any priorities in the beginnign of the project. So my latter priorities and discoveries was....

AIM/GOAL

My aim is to investigate what happens to the gestalt when allowing discourses that are related to the medical ventilator to take part of the design process. This includes human experiences, although I’m not here refering to an universal objective view on human experience. Instead it includes my own embodied experience and observations as a licenced vocational nurse at a medical intensive care unit. It also includes opinions from the staff I have interviewed, and other people I have interviewed, former ventilator patients and relatives, and people with their own imaginations of what it would be like to be in ventilator treatment. I have included other peoples subjectivities in my own subjectivity.

Many of the discourses I will be using in the design process are part of a greyzone of ethical matters. I will be using design and applied aesthetics as a critical practice and as a tool to handle complexity and normative discourses. The result may be used as an inspiration to a possible product development in this area, as well as problematizing both the normative medical industrial design as well as the greyzone discourses which the ventilator is situated within.

METHOD

HERMENEUTICS - AS AN INSPIRATION

My design approach is investigative, explorative and critical. I see my design process as reflective and intuitive. My approach is inspired by, and stems from industrial design, critical design, conceptual design, artistic research and hermeneutics. The part of hermeneutics that I use as an inspiration for my approach is the possibility to work with a subjective and qualitative approach. In hermeneutics, objectivity is questioned, and problematized. Subjectivity is seen to have a scientific quality. The term hard objectives, was developed by Sandra Harding as a way of problematizing objectivity and as another more positive way to refer to subjectivity within science. One of the reasons I’ve found hermeneutics helpful is that it allows exploring a subject without having to deal with and explain the whole field generally. Instead the investigation can be very particular, and is not meant to cover the field in general, but in particular.

Hermenutics, is derived from interpretation of texts, which resembles Explorative Design Approach but as I see it it may be interpreted to have more to do with the stories than the texts in themselves. This is also why I find hermeneutics helpful in design, since design also is about stories. It is hermeneutics as an epistemology that I find useful, the way we understand knowledge, and science, but it's important to state that I don't intend to use hermeneutics in a scientific way. It's used as an inspiration for my design approach, and as one way to help legitimise working subjectively in design.

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4.I'm presenting this approach on page 7.
In positivism, knowledge, and science is understood as objective, and as a general “truth”. To prove the truth, there is a demand for detachment from the researcher, who has to be “objective” and to have more quantitative information to “prove” the result. This scientific approach may be useful, but as I see it, since veritable objectivity is not possible, there is also a danger that any, implicit unintentional ideology is well hidden behind claimed objectivity. In hermenutics you may be more explicit with your intentions.

FROM THE ROOTS

My design method is derived from professor Cheryl Akner Kolers teaching at Konstfack University College of Arts Crafts and Design. In her method the design process is closer to the roots of the product. By this I mean that the inspiration that drives the design and formgiving process is discourses related to the product/service or problem area.

The advantage of the design process is that the methods are used in an flexible way and become a process in itself. The design process is non-linear, meaning that the phases blends into each other in no specific order. The method cannot therefore be foreseen in advance. It is an on going process to choose methods. Examples of methods I will be using are: interviews/conversations, material, including textures, testing methods, sketching in 2D 3D, writing, reading, filming, my own tacit and embodied knowledge, etc. I will be documenting the method throughout the report, in each sections.

LIMITATIONS:

My master exam project is mainly a formgiving project. The final design is a conceptual solution/vision/discussion. The result may be used as an inspiration to a possible product development in this area. I will focus on certain aspects of the product, and work less on other areas. Exactly which parts, will be decided later in the design process. I will not include production methods in my solution. The result will be visualised with a physical model. Other limitations is that I will be focusing on the experience I get from MIVA Södersjukhuset, and the ventilator MAQUET SERVO-I.

DEFINITIONS

Discourse
I will be using discourse to refer to different discussion environments, both on a macro or micro level. This communication environment is already known. Discourse is useful term, to be able to problematize and discuss communication environments without having to go into details. A discourse constitutes, according to Michel Foucault, sequences of relations to objects, subjects and other enunciations. “Discourse to me comprises all forms of meaningful semiotic human activity seen in connection with social, cultural, and historical patterns and developments of use.”

INDUSTRIAL DESIGN APPROACHES

Two Major Schools

GUIDELINE BASED APPROACH
Guideline Approach is a positivist inspired approach where the design process is seen as rational, and therefore more linear. This approach stems from engineering. It claims to be objective and it aims for optimal solutions.1

AESTHETIC APPROACH
I’ve chosen to use what Lerdahl refers to as an aesthetic approach, in my exam project. According to Lerdahl, Aesthetic Approach is based on personal experiences and intuition. The process is individual and can’t always be explained rationally. This approach stems from art, crafts and industrial design.2 Aesthetics, is here referred to as human meaning making in everyday life3. This approach is subjective, and the epistemology can be described as similar to hermeneutics. The aim is to explore and investigate, and the result is one possible solution or a process based result.4

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2. ibid.
Aesthetic approach

The Aesthetic Approach is used in my project to let me include my personal experience and intuition, along with other people’s subjectivities. My process can’t be understood as rational the same way as in a guideline approach. Although within this approach there might be a logic, that can be felt and even understood by others. I’m aware that I have learnt to censor myself within societal norms as well as a guideline approach inspired industrial design at Konstfack, which might affect me when working with this approach.
GUIDELINE APPROACH  KONSTFACK  MY POSITION  AESTHETIC APPROACH

Positioning
Daniel Fällman “Designforsknings tre fält, 2007 in: Under Ytan: En Antologi om designforskning, Red: Åsa Harvard, Sara Ilstedt Hjelm, mfl. Raster, Own translation. The figure is also from Fällman, with minor additions and changes. I find this model useful to describe problems when using the explorative design perspective, although Fällman has missed to point out that there is also an epistemological dimension on this. If using the other two design research approaches within another epistemological perspective than the positivist, they will find that they have similar problems as explorative design has.
Being provocative?

EXPLORATIVE APPROACH

Another way of describing and understanding my method and design approach is by using researcher Daniel Fällmans model.

Explorative Design Approach is described by Fällman to be explicit subjective, explorative, meaning making and interpreting. It focuses on alternatives, possibilities and futures. It often transcends, changes and redesigns the problem rather than solving it. The projects may be self initiated by the designer, and does not have to be directed towards a market. The product or artefact may be a symbol for what is possible or seen as an alternative. Societal critique is often inbuilt to the product.

As researcher Daniel Fällman mentions Explorative Design is often seen as provocative, experimental and critical since it is an approach that is questioning norms in design and in society. Therefore the approach might cause societal consequences. 1

My own reflection is that when you are using an Explorative Design Approach, you are likely to get accused of doing “art”. And this is seen as something very negative. “You must make sure you’re not doing art!” Is a sentence I have encountered several times. The accuser doesn’t explain why s/he sees this as something negative. There is also a risk of being accused of being provocative, which in similar manner as with the previous example, being provocative is also meant as something negative, something to be avoided. The accuser doesn’t realise that their interpretation might have something to do with themselves and their own normative view on design.

Another strategy people have been using to put down explorative design is to claim that your design is “art”, and that this is something positive. But in fact it is not respectful to tag your work as “art” when you have refered to your work as being design, using a design process. This strategy may be a way for people to label design they do not understand as something “other” than design.

The accusations can also be used as a way to dominate a view upon another. This is of course quite alarming, because it may hinder students that want to use this approach of design. This field of design is of high importance since it can give design a voice in the societal debate. Design has a strenght to materialise and make ideas “real”, by using physical models to visualise the ideas, which enables communication to others than just designers. This approach has a high potential to be able to change things in the society.

I don’t intentionally work provocative. Not that I see anything wrong with doing so, if there’s a purpose behind it. I just want to challenge norms that I find problematic. That can be seen as provocative, rather than as a consequence of my decisions, actions, questions, solutions.

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There’s a lack of differentiation. These are all different brands, but have the same form language.
The Medical “Style” in ICU Care

Since the products are inspired by a constructed medical expression norm it’s hard to see the difference in what kind of product it is. This portable table with monitors resembles the medical ventilator.

A medical ventilator by Maquet.

Since the products are inspired by a constructed medical expression norm it’s hard to see the difference in what kind of product it is. This portable table with monitors resembles the medical ventilator.
Context

The ventilator context can be interpreted as very cluttered, since there are often 3 monitors, per patients, other apparatus, and tubes connected to the patient.
THEORETICAL FRAMEWORK
AESTHETICS and ETHICS.

Pragmatist Aesthetics

In this thesis I will be working from an aesthetics perspective professor Cheryl Akner Koler is using in her teaching at Konstfack. I will have my own interpretation of her approach and methods. The aesthetic approach Akner Koler is using is referred to as a pragmatist aesthetics approach. In pragmatist aesthetics, theory and practice is unified. Pragmatist aesthetics is seen as a perceptual experience involved in everyday life. Alexander Baumgarten, a German philosopher, defined in 1735, aesthetics as “the science of sensous cognition”. With sensous he meant the fusion of our senses, and with cognition he meant ‘to know’. 1

Mark Johnson defines aesthetics as “Aesthetics is properly an investigation of everything that goes into human meaning-making.”2 In his book The Meaning of Body. Aesthetics of a human Understanding he claims that aesthetics is the study of everything that goes into the human capacity to make and experience meaning. Johnson is using meaning in a very broad way. Claiming that meaning is not only about concepts and propositions and sentences, but also about images, sensimotor processes, feelings, qualities and emotions, bodily processes, which all help to create meaning in our world, he aims for an aesthetic of human understanding to be the basis for all philosophy.3

“Herbert Marcuse describes aesthetics as ‘the result of the transformation of a given content, an actual or historical, personal or social fact, into a self-contained whole.....’4 This means that aesthetics can be regarded to have inherently ethical and political qualities/praxis.5 Both art and design are aesthetic practices with subversive potential and transformative power.6 Marcuse states that “he more immediately political the work of art, the more it reduces the power of estrangement and the radical, trancendent goals of change.” With this he claims that there “may be more subversive potential in the poetry of Baudelaire and Rimbaud than in the didadic plays of Brecht.”7

I would argue that both Baudelaire and Brecht approaches can be subversive, and that both approaches are needed for societal changes. Another way that is more easy to me to relate to is music. In the 70's progressive music can be described to represent these two perspectives. Progressive music with political lyrics, but with conservative aesthetics, and progressive music that was progressive in an aesthetic way. To me it seems as if the aesthetic as ethics approach is missing in the Industrial Design discourse at Konstfack. There is a manner of “speaking” very explicit in the form language of products, at the same time there might be lack of political analysis of the form language. I see a great potential of working more implicit, and talking through the product and the aesthetics of form. I don’t see why we have to shout out loud at all times. My intention is therefore not to scream, but to talk with a voice that might be discovered with time. I’m aware of that my voice still might be interpreted as loud since I’m breaking new grounds in a conservative field.

3. Johnson, 1007, s.x
5. ibid s 81
7. ibid s 83
Working more implicit may be seen as a way to include the receiver to the product, which Edith Ackermann argues in her article about the experience of artifacts. “A setting that gives out all the secrets before you even start wondering is disengaging because it excludes you as a partner. a setting that offers no resistance at all is disengaging because it’s predictable.”

Often appearing arguments about medical design is that it has to be predictable to be safe, but I’d like to question this argument. Maybe engaging products are more safe?

Rune Monö has influenced Industrial design with his view on design consisted on communication, technical needs and ergonomic needs. In this model aesthetics is replaced by semiotics, “to *read* products through their visual signs and codes.” As Akner-Koler points out in her dissertation; his model “ignored the aesthetic relationships that hold the holistic gestalt together.” Maybe Monö’s model and the semiotic approach sometimes is responsible for being mix-uped with aesthetics, resulting in an absense of aesthetics? I will not use semiotics as an replacement for aesthetics in my project, although I use semiotics. I don’t see semiotics as static and universal. Constructed meaning can and should be challenged.

**AESTHETICS IS THE SCIENCE OF SENSOUS COGNITION**

This means that aesthetics is the fusion of our senses.

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9. ibid. s. 4
10. Akner-Koler, Cheryl, 2007 s. 25
11. Akner-Koler, Cheryl, 2007, s. 25
DESIGN AS A CRITICAL PRACTICE

Design can be accused of being merely a tool for capitalist consuming economy to make more profit. As Anthony Dunne and Fiona Raby, Critical Designers, and professors of RCA, London, state: "...Design... needs to establish an intellectual stance of its own, or the design profession is destined to loose all intellectual credibility and be viewed simply as an agent of capitalism." If discourse of criticality is lacking in design, it will be difficult make visible the norms of mainstream practice, and to produces alternatives. This is something I totally agree with and this is also why I think it's important to include criticality in the design process. Even the economical market wins on a critical perspective, because without it the market will stagnate.

A documentary about advertising for children in the USA, shows clearly how marketing is about manipulation of children. Marketing officer Lucu Hughes, in Initiative Media tries to ignore her responsibility in this matter simply by ignoring the ethics completely, she says: "Somebody asked me, Lizzy, is that ethical? You are socially manipulating these children. Well, is it ethical, I don’t know, but our role and initiative is to sell products, and if we do that, we have done our job.

This is a frightful example of what can happens if we leave design to market forces alone. I have too many times heard people within our discipline say that: “what can we do, we’re just designers!”. To the contrary I claim that it is our role to question and show alternative ways. We have a powerful tool and the opportunity to work visionary.

As Ramia Mazé so well states in her dissertation Occupying Time. Design, technology, and the form of interaction, : “.... critical design might create openings for reflection, debate, and interpretation in use. This is one of my intentions with my project. As Mazé highlights in her dissertation, "...design is inherently political" , which is something I agree with. The problem is that there is a tendency to ignore what political stance design is hiding behind. “ The problem is perhaps not even the image making itself, but but in the politics presupposed in the images. What branding and soft power do is a fundamental challenge to the project of dissent and ‘the political’; place branding and public diplomacy are further recasting power and influence into something that is already shaped before politics proper come into play.

Normative design often hides behind neo liberalism in the political market economy. Maybe it’s time to question if we shall continue to allow this perspective to dominate. And to discuss the consequences it leads to.

Political issues is about other power issues like gender, ethniticy, sexuality, age, species, etc. Industrial Designer and PhD student Karin Ehrenberger makes this visible in her master thesis Design och genus - hur vi formger produkter och hur de formar oss”, it translates; Design and gender - how we design products and how they design us.

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3. Dokumentärfilm: “Konsumentronsvecka: Köpsalig barn”, SVT. 2010, tor 13 jan, from: http://svtplay.se/t/103478/dokumentarfilm 2010-01-12 The quote is modified as a mix between the swedish textured translation and her verbal quote.
4. Mazé, 2007, s. 216
5. One can also read “product” here, instead of image.
FORM AND FORMLESSNESS

Form
Is both a noun and a verb. A form and to form. It refers to "the realisation of concrete objects as well as to the organisation of ideas." John Dewey defines form as a relationship and the organisation of a unified whole.

Formgiving
Professor Cheryl Akner Koler has defined formgiving as: ..." the conceptual and perceptual process of developing the product gestalt into a physical form, as an integrated aesthetical process within the industrial design process." 1

Formlessness
This project involves the human body, so I have found it fruitful to investigate bodily form, including formlessness. Formlessness is not easy to define, since it has no simple organized contours or structures. It challenges the norms of beauty and taste. In professor Cheryl Akner Koler's dissertation, she has a section that responds to her work with a taxonomy of form with a heritage in geometry. Here she problematises the concept of form. Formless, is used as an atonym to form, to open up for aesthetics beyond the geometric/organic form. It is not a postmodern anti aesthetic approach, but rather a way to include chaos and complexity of form and formlessness in the real world. 2

Akner-Koler says in her dissertation: "The longer I worked with form and formgiving in the industrial design educational community, the more claustrofobic I felt. " 4 It was formlessness that led Akner-Koler back to "an immediate, improvisational and embodied working method." This is something that I can relate to. I started questioning myself why I was working with forms, that could be interpreted as mainstream “slick House music”, which is a music style I often find very shallow. 5

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1. Akner-Koler, 2007 s.16
2. ibid. s.2
3. ibid. s.2
4. Akner-Koler, 2007 s.26
5. This is of course my own subjective view. I'm aware that there might be house music that isn't shallow. But I'm referring to commercial house music.
PRE-STUDY: DISCOURSES RELATED TO THE VENTILATOR

In this chapter I will explore some of the different discourses the ventilator is situated within, both historically and today. The ventilator has affected the definition of death and is responsible of both new possibilities and problems.
PREVIOUS STUDIES IN THE FIELD
I couldn’t find much that has been done previously with an aesthetic approach. I found a collaboration project at UID with both Interaction Design and Product Design students. They found similar problems, and the solution is a product that is fastened on the tube. It still has a graphical interface. The monitor is not moved.¹

### PROBLEM AREAS AND SOLUTIONS

Staff is talking to the patient even if s/he is unconscious.

“Patient goals: Being treated as a person, be safe, know what is going on, go back to life”¹

“Relative goals: Know their loved one will be fine, make sure their loved one is treated like a person, know what is happening.”²

I found that they had found similar problem areas; like the problem with the monitors. There are too many, 3 per patient, and the ventilator monitor is placed apart from the other two monitors.

Staff tends to look over the patient and focus on the monitor instead of the patient, which contributes to dehumanising the patient.

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1. Kotronias, Sotiris Focus on Detail, Project report / MA Interaction Design / Umeå Institute of Design
THE MEDICAL VENTILATOR
The Iron Lung

Historically the ventilator was first invented to help patients survive the polio epidemics in the beginning of the 20's century. It was a form of a mechanical non-invasive ventilator, named The Iron Lung. One of the first ones was introduced in 1928, with an updated version in 1931, designed by John Haven Emerson. In the 50's Emerson together with Harvard University developed a mechanical ventilator for anesthesia.\(^1\)

The ventilator changed the view on life since patients could be treated long term if needed. One woman, Martha Mason lived almost all her life in an Iron Lung due to her polio complications. She was paralyzed from the neck and downwards. She died 2009, but lived 60 years in the ventilator. Martha Mason wrote a biography about her life in an Iron Lung. She was dependent on the apparatus for 60 years living in a 7-foot-long, 800-pound iron cylinder that encased all her body except of her head. She was paralysed from the neck and down, a complication from her childhood polio disease.\(^2\)

1. http://en.wikipedia.org/wiki/Medical_ventilator 2010-09-09
WHAT IS A MEDICAL VENTILATOR?

ventilator /ven-ti-la-tor/ (ven’t-ə-la-tor)
2. a device for giving artificial respiration or aiding in pulmonary ventilation.¹

The medical ventilator is defined as a computerised breathing machine for patients who are unable to breathe sufficiently by themselves. Although it is also possible to do this by hand with a bag valve mask or a hand operated machine. Ventilators may also also be equipped with monitoring and alarm systems for patient-related parameters (e.g. pressure, volume, and flow) and ventilator function (e.g. air leakage, power failure, mechanical failure), backup batteries, connections to oxygen tanks.²

1. http://medical-dictionary.thefreedictionary.com/Medical+ventilator 2010-09-09
Ventilator parts

THREE PARTS
1. MONITOR
2. MACHINE
3. TUBES

THE INNER TUBE IS CONNECTED TO THE VENTILATOR TUBE.
When is the ventilator treatment necessary?

Ventilators are used in intensive care medicine, home care, and emergency medicine and in anesthesia. Ventilator treatment is used when the patient can’t breathe or if the patient can’t have clear airways, caused by illness, an accident or during surgery. Examples of diseases that may require ventilator treatment; MS, ALS, asthma, pneumonia, chronic lung diseases.

It is a treatment given as a last resort, and only when the patient’s condition is treatable. Otherwise given it could lead to consequences with a lifelong ventilator treatment.

THE VENTILATOR IS REGARDED AS A LIFE CRITICAL SYSTEM

Regarded as a life critical system, a ventilator has an inbuilt back up system to ensure that failure of the system can’t endanger the patient. Examples are: back up batteries, hand-driven alternatives, warning systems.

Medical staff I talked to also has high respect for the apparatus and the ventilator treatment. “You are on guard all the time, nothing is allowed to go wrong.”

1. http://en.wikipedia.org/wiki/Medical_ventilator 2010-09-09
3. Interview 3 with ventilator therapist/ medicine student, own translation.
5. Interview 3. own translation
Study visit at Maquet

Maquet

MAQUET, is a swedish company, part of GETINGE.

It was Getinge who invented the first invasive ventilator.

They have a factory in the building, and industrial designers, marketing, engineers works close to the factory workers.

They design a new ventilator every once in 10 years! Software changes are done more often.

MAQUET SERVIO I has an interface that is more user friendly than their competitor DRÄGER. This is my own conclusion, by a study visit to the ICU and MICU at Södersjukhuset.

They have many advantages, that you dont need special huge arms connected to the ceiling that’s needed with fixed ventilator, like DRÄGER. One advantage with DRÄGER is that their ventilator allows to have all monitors beside each other.

They don’t know if they design the ventilator tubes themselves.
The bigger complete version - gives a lighter and smaller and more modern expression.

This is the “smaller” simpler version. But it gives a chunkier, older expression.
Intubation is the insertion of a breathing tube or artificial airway (endotracheal tube - ETT) into the trachea via the mouth. On occasion the tube may be inserted through the nose down into the trachea.

A patient will require intubation when they are unable to breathe for themselves. This may be as a result of a disease process or certain medications such as anaesthetic drugs. Once intubated, a patient will usually be attached to a breathing machine (ventilator). Together this equipment will take over some or all of the work of breathing until the patient is able to do this for themselves.

The patient is laid down with a bedside monitor attached to continually assess vital functions. Intravenous cannulae are required for the administration of the drugs and fluids. \(^1\)

The patient is given an anaesthetic to put them to sleep. A laryngoscope is used to open the mouth up, see down the throat and pass the ETT through the mouth and into the trachea. The cuff of the ETT is blown up using the pilot tube. This creates a seal around the tube within the trachea. The correct position is checked in several different ways and then the tube is anchored to the patient using adhesive tape or a plastic device.

The patient will then be attached to a ventilator to assist with breathing. A chest X-ray is usually performed to confirm placement.

Once a patient is intubated, they may be given a continuous infusion of a sedative drug so that they can tolerate the tube. The patient will be unable to talk because the ETT prevents the passage of air through the vocal cords.

Tracheostomy

In my project I have chosen to work with invasive ventilation via a tracheostomy. The reason for my choice has been that it is more related to the monster as one nurse said in an interview.¹

If long-term treatment is necessary INTUBATION will be replaced by a TRACHEOTOMY cannula. This is done to protect the vocal cords and to allow for the patient to be off sedation.²

¹ INTERVIEW/DISCUSSION NO15, midwife and nurse.
² http://en.wikipedia.org/wiki/Positive_airway_pressure 2010-09-11
Contemporary tubes by Maquet

What do you see when you see a patient with a ventilator? The machine is hidden behind the bed. You can only see the monitor. The first thing you notice is the tube.

What do they look like? They don’t appear to have given much design efforts on them, especially not the expression they radiate to us. When analysing the form of the tube with people, they referred to it as a vacuum cleaner tube, “sladdrig”, cheap.
CONDITIONS AFFECTING THE FORMGIVING.

30 degree angle of the bed is preferred. It helps prevent VAP, Ventilator-Associated Pneumonia.

The filter tube, the tube closest to the patient, is changed when it gets cluttered with mucus and blood, or condense. Every day.

One person of the staff is always guarding the patient. The patient is never left alone.

TUBE is hanging on the side and back towards the ventilator. It doesn’t touch the patient.

Needs to move from side to side, when turning the patient.
THE MEDICAL VENTILATOR - CHANGED THE DISCOURSE OF LIFE AND DEATH
THE GREYZONE OF LIFE AND DEATH
Ventilator as a lifesaver and a monster

VENTILATOR FUNCTIONING AS A:

life
LIFE-SAVER

dead
MONSTER

GREY ZONE

VENTILATOR TREATMENT
Patient journeys in the greyzone

1. A patient with pneumonia comes into hospital. The patient has difficulty to breath and is given ventilator treatment to help support the breathing. Gets well and is released of the machine.

2. A patient comes in for a routine operation, unexpected complications occurs, resulting in problems for the patient to breath. Ventilator treatment is started. If the patient become worse and has to stay in the ventilator, there is a risk ending up being closer to death. That you won’t survive but you will stay in the machine that keeps you alive, and prolongs the death.

3. Comes to hospital with a heart stop. Gets treatment and has a full recovery.

4. Comes with a heart stop - doesn't get better, is not brain dead, and has to stay in the machine. Coma.
Brain death

Brain death is a condition which is permanent. All brain activity has ended irreversibly. It is not to be mixed up with coma. When the brain dead there is no way of reviving it. The introduction of brain death was crucial for organ donations and transplantsations in Sweden. It means that you can take organs from donators when the heart is still beating, which wasn’t possible without the law about brain death was introduced 1988. 1

Interviews reveals that not everyone is familiar with brain death. "I don’t know so much about it. Is it possible to resuscitate the brain as with the heart?" 2

The definition of brain death is not clear to everyone I talked to. Some people opposed to the definition, and it seems that it might be mixed up with the condition of coma. Brain death has led to a discussion whether “Are you body or mind?”, which indicates a dualist view of the body.

Changing the law was seen as controversial when it was introduced. 4 Since then brain death has been widely accepted. There are some critics, claiming that the human worth is challenged by brain death and that it should be subjected to an investigation on what human value is. 5

To diagnose brain death 3 steps are : 1. DT angio in the brain. To see if there is any circulation in the brain. 2. Breathing is determined by CO2, therefore the ventilator is turned off and the CO2 curve is followed. If its below a certain level, the drive is not prevalent, which means that you won’t be able to breath again ever. 3. Neurological testings. To determine if there is a permanent absence of neurological functioning. 6

"1 § Vid tillämpning av bestämmelser i lag eller annan författning som tillskriver en människas död rättslig be tydelse skall gälla att en människa är död när hjärnans samtliga funktioner totalt och oåterkalleligt har fallit bort. 2 § Det ankommer på läkare att i överensstämmelse med vetenskap och beprövad erfarenhet fastställa att döden har inträtt. Detta skall ske, om andning och blodcirkulation upphört och stilleståndet varat så lång tid att det med säkerhet kan avgöras att hjärnans samtliga funktioner totalt och oåterkalleligt har fallit bort.
Upprätthålls andning och blodcirkulation på konstgjord väg, skall dödens inträde i stället fastställas, om en undersökning av hjärnan med säkerhet visar att hjärnans samtliga funktioner totalt och oåterkalleligt har fallit bort. 2 a § När det har fastställts att döden har inträtt får medicinska insatser fortsättas, om det behövs för att bevara organ eller annat biologiskt material i avvaktan på ett transplantationsingrepp eller, med avseende på en gravid kvinna som bär på ett livsdugligt foster, för att rädda livet på det väntade barnet. Insatserna får inte pågå längre tid än 24 timmar, om det inte finns synnerliga skäl." 7
Organ transplantation

Even if one can’t say there is one Christian view on donation there is a general positive stance towards organ donation in all religions.\(^1\) The Pope Johannes Paulus II was positive to both transplants human to human and xeno transplants at an international transplant conference in Rome 27/8-1/9 2000.\(^2\)

Thanks to the brain death definition, the amount of kidney transplants has risen.\(^3\)

Life quality - the right to die

New discussions appeared whether a patient has the right to get help to turn off the ventilator, with a recent case in 2010 where a patient was approved to have the ventilator turned off, so that she would die. The patient was a 32 year old woman who was born with a neurological illness and had lived with a ventilator from age 6. Her wish was to die and to be sedated when the ventilator was turned off. Her wish was approved by Socialstyrelsen. The woman felt “relieved and happy” by the decision.\(^4\) The law does not approve of euthasia, but gives the patient right to refuse and choose treatment, if s/he is fully conscious about her/his wishes and its consequences. The sentence has added to the grey zone of life and death discourse.\(^5\) There is problem both de jure and de facto that it’s not always clear, medically, when the disease is terminal and not possible to treat anymore. Another possible problem is that medical staff are trained to save life and it might feel like a failure not to do so.\(^6\) The ventilator is part in the view of that “Death has become an illness that we are trying to treat and cure. We don’t think we will die anymore - it’s avoidable.”\(^7\)

Discussions about the right to die, shows that it’s strongly connected to the illness of the person that wishes to die. One person tells me that her grandmother was getting ventilator treatment, and that she was thinking: “I hope she gets to die”. She argues that keeping someone alive is not always positive. It depends on the situation and the person and the illness.\(^8\)

\(^1\) http://www.katolsk.no/nyheter/2003/10/04-0016.htm 2010-09-26
\(^2\) http://www.yes2life.net/religion.shtml 2010-09-25
\(^3\) Interview no 3, a ventilator therapist/med student.
\(^7\) Interview 6. Own translation
\(^8\) interview NO4.
Ventilator on film - Million dollar baby

Ventilator treatment in the film Million Dollar Baby is very tragic and dramatic. The main character in the film that is subjected to the treatment because of an unfair punch in a boxing competition wants to die after losing all hope of a full life again. She doesn't feel like she has any life quality. She suffers and pleads for help to turn the ventilator off by her trainer and friend.

An interesting outcome from the interviews/discussions is that there is a strong notion that it is the relatives that makes the decision about turning off the ventilator. The informant expresses concern about difficulty in making the decision to turn the ventilator off. "There might be a discrepancy with rational thought and the emotional feelings when relatives makes that decision." Another informant says "You turn the machine off you don't take away the tube to turn it off", and argues why the tubes makes a central part in the machine.

This common misunderstanding is highly likely to be derived from American films or TV series. In Sweden the ventilator is turned off if a patient is brain dead. This decision is made by doctors, not relatives. The doctors follow a specific procedure to make the correct diagnosis.

1. Interview 2, own translation.
2. Interview 2, own translation.
3. Interview 2 and 4, own translation.

http://www.youtube.com/watch?v=MlgV4X8B0cY&feature=related
INTERVIEWS/DISCUSSIONS/OBSERVATIONS
METHOD

I have had discussions with a number of people, both within design and people outside. Nurses, doctors, design students, medical students, midwives, engineers, designers, hospital staff surrounding the discourses of the medical ventilator. The interviews have been held in various environments; at the hospital, at Konstfack, at cafes. Some of the discussions were held in small groups. The interview situation is sometimes spontaneous. In these discussions, I take an active subjective part, and I see the interview situation as a subject to subject relation, although I try to steer the discussion, when I find it necessary. Some interviews are voice-recorded, some are filmed, and on some occasions I have been taking notes instead. This might affect the outcome in different ways since some people get nervous when you record them, and less nervous when you only take notes. But if you take notes, some important information might get lost. My informants are anonymous, so I have changed info about them to make sure that they have been unidentified.
INTERVIEW EXCERPTS

Darth Vader - Unhumanised

"Scary breathing noise. Associated with Darth Vader. A living organism - something human - and at the same time not.
Knows about brain death. It is a medical definition and it is permanent death. Are you body or mind?"

You are connected to a machine and therefore not a real person anymore. It is very negative. It is scary not to be able to move. A permanent condition. A huge handicap to carry around a big chunk. you loose humanity.

That the ventilator is closely connected to the sound of breathing. The informant tells me about a patient that was lying awake in a ventialator, and how she felt that the medical staff didn’t treat her as a person anymore.

“To get ventilator treatment is the worst thing that can happen!”

Greyzone

(me) “Have you been thinking about the greyzone of life and death that the ventilator is responsible of?”
(nurse) “No, I think most people don’t think about it”

Lifesaver vs. monster

“We don’t think we will die - but be cured.”

“We don’t talk about death. Ventilator and TV series. That it is acute, crisis. that death has become an illness we are trying to prevent and cure. that we don’t think we will die. That it is avoidable.”

There is a strong refusal among some of the staff to view the ventilator as something negative, or as a monster. They seem to have developed a stategy to ignore the problem, as a way to cope with the difficult situation they might face.

“I see the ventilator as an aid, but then if it can become a problem and cause suffering for the patient, I can’t really relate to that. That the ventilator is a bad thing.”

“I don’t see the ventilator as a monster, I really can’t relate to that.”

“(me)-How does it feel for you if the patient gets stuck in the ventilator, and that this prolongs the suffering for the patient? “

“I don’t know. It’s just the way it is.”

“(me) Could you refer to the ventilator as a monster if it’s not helpful for the patient anymore? “

“I really don’t think about it. I see it as an aid for the patient.”

“We have had patients that gets stuck in the ventilator, then it ca become a monster.”

(me) How does that feel?

“- It feels really awful.”

(me) Because you feel powerless?

1. Interview no 1. see appendix.
2. Interview no 5. see appendix
3. Interview no 6. see appendix
4. Interview no 2. see appendix
5. Interview no 14 at hospital with 1 nurse, own translation.
6. Interview no 2 see appendix.
7. Interview no 6
8. Interview no 10
9 Interview no 10
“-Then you just go and wait for the patient to get an infection or something. And you relieve the pain. It’s awful for the relatives as well. It happens when you intubate a patient that shouldn’t have been. They were to ill from the beginning.”

A discussion about tracheostomy: “- ...the scarring is always a constant reminder of the monster. This I find very scary. The scar is like a bodymark for the rest of their life.”

“- I believe that a tracheotomy is a greater interference in your life than just to have been intubated. ... it’s a scar that will never go away.....”

The tube

“You turn the machine off, you don’t take away the tube to turn it off”, says one informant, and argues why the tube makes a central part in the machine.

“It looks like a vacuum cleaner tube. It’s very cheap looking”

“Has a lot of respect for the ventilator and the tubes on guard. Nothing is allowed to go wrong.”

Implicit knowledge

(me) “You told me that you don’t look so much on the monitor”
(nurse) “If there is an alarm I’ll check what it is.”
(me) “How do you do that? Do you look at the alarm parameters in numbers or graphs?”
(nurse) “I’ll check why it’s alarming. It will say whether it’s high pressure och breathing frequency.”
(me) “How do you use that information?”
(nurse) “Well often it means that you have to do suction.”
(me) “Do you find the numbers showing for example the peak pressure helpful?”
(nurse) “No, because I’ll look and check on the patient.”

The nurse tells me that she’ll listen to the breathing as well.
Staff strategies to cope with ventilator treatment
gone monster

DENIES PROBLEM. Sees treatment and nurse role as helping the patient only.

DETACH - FOCUS ON GIVING PAIN RELIEF, SEDATION, CARE (OMVÅRDNAD). Doesn’t want to think about when the treatment is prolonging life and pain for the patient. Focuses on other things to cope.

SEES PROBLEM BUT FEELS POWERLESS - FOCUS OM PAIN RELIEF, SEDATION, CARETAKING. Has to put on the tube again if patient tries to remove it.
I’M DESIGNING A TUBE!

Hierarchies and power

HOSPITAL HIERARCHY AND GENDER

Historically work division, emerged from technical development and the industrial revolution, through Adam Smith’s theory about the division of work, made productivity more efficient. This idea also came to affect the organisation of hospitals and healthcare. Even today hospital wards are organised in this way. ¹

The idea of work division has had great impact on gender work division, constructing hierarchies of gender, since technology is related to male values and therefore has higher status. Work in the hospital related to technology has higher status and is prioritised, for example ICU wards, while work closer to the patient, like geriatric care has low status.

The gender hierarchy is both vertical and horizontal; in geriatric care there are mostly women doctors, and most of the nurses and aid nurses are women in geriatric care. In technology intensive work, there are more men and it has more status. Historically there is evidence that when too many women enters a male dominated area it looses its status. In the hospital the patient has the lowest status, and women patient has the lowest status.²

HOW IS THIS RELATED TO THE MEDICAL VENTILATOR?

The hierarchy of technology in the medical ventilator follows this theory very well. The machine, which contains the pump and the interface, and the machine doctors are responsible of, is design with care. But the tube that is connecting to the patient, a part that is very important of the treatment, without the tube, no treatment - is mostly handled by nurses and aid nurses. It has a lower status and is not really seen as a “real” part of the ventilator.

The tube is also what you see as a relative. It is a life giving machine that is connecting to the human. And it hasn’t been given much care in design. In fact Maquet, wasn’t quite sure if they were designing them at all. Or if they just buy standardised tubes to their collection.

Not much has been done to the design of the tube, except that GE healthCare has a divided tube to make it possible to use only one, insted of two tubes to the patients throat. I’d like to argue that here we have an unexplored field that can help and improve the experience of ventilator treatment both for patients, staff and relatives.

Even from the beginning of my project I was focusing on the tube. It felt natural to work on the tube, since it such a strong symbol for the medical ventilator. A symbol for lifegiving. I also found it very interesting to work with a machine that literally connects to the human body.

After a while I started to realise that what I was calling a ventilator, was just seen as a “tube” and of very low status. When I made a study visit to Maquet, I got to know that they might not even design the tubes themselves. They weren’t even aware if they did or not. But the industrial designer I talked to was very positive to my work and found it important. She was very inspiring. But the industry is very conservative, in a similar way that the hospitals are. It’s very hard to change things.

². ibid.
Discourses of the ventilator to be used further in the formgiving process

VENTILATOR AS A LIFESAVER AND OR A MONSTER

THE VENTILATOR HAS ARISED A GREYZONE IN LIFE - DEATH - CREATING AMBIGUITY

PATIENTS LOOSE HUMANITY IN VENTILATOR TREATMENT

HIERARCHY AND POWER AFFECTS THE VENTILATOR

THE TUBE IS VERY IMPORTANT. CONNECTS TO THE MACHINE

MONITOR GETS TOO MUCH FOCUS - STAFF STAND LOOKING OVER PATIENT AND ON THE MONITORS INSTEAD

HARD TO SEE THE MONITOR FROM A DISTANCE.

TOO MANY MONITORS (3 PER PATIENT) AND A PROBLEM THAT THEY ARE PLACED IN DIFFERENT DIRECTIONS.
EMANCIPATING AN AESTHETIC DISCOURSE WITHIN A FORMGIVING PROCESS
CONTEXT OF A CONSTRUCTED DICHOTOMY
CLEAN - DIRTY

Contexts of constructed dichotomies, can be seen related to other dualist thinking. The purpose of this is to make visible the hierarchy and power behind this thinking. This dichotomy can be seen in the ventilator parts. The tube has a stiff sterile form, and contains mucus and blood. The form has no connection to its contents at all.

<table>
<thead>
<tr>
<th>clean</th>
<th>-</th>
<th>dirty</th>
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<td>high tech</td>
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<td>man</td>
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Mucus collected into a plastic jar with a disposable plastic bag inside.
CONTEXT OF A THROAT
BODY & VULNERABILITY

The tracheostomy is placed in a very sensitive area of the body. If you are scared or see something that’s frightening you, you might hold on to your throat to “protect” yourself. It’s an area that is related to suffocation, some people can’t wear turtleneck sweaters since it’s hugging close to this area, even causing throw up reflexes. ¹

¹ From interview Beatrice ****
Form analysis with medical staff

I did the form analysis on one to one. I brought the existing parts of the ventilator tube and let them touch the parts and asked how the were experiencing them.

The existing tube felt very cheap and reminded them of a vacuum cleaner. It felt a bit sloppy (sladdrig), especially the tube connection to the throat.

They felt that the filter were soft, like cotton wool or as soft foam. It’s meant to moist the air, since added oxygen makes the air very dry.

The tube felt like disposable products, cheap. This is also the case, it’s changed often. When it gets dirty, full with mucus and blood it is disposed.

I asked the nurse to breath through the tube. It felt easy, he said, but it’s the largest one, and he didn’t try for very long. The tube is quite hard. It’s meant to be, so it can’t be bent and block the air. When patients wake up, it’s common that they bite on the tube. It feels like a rubber tube when you bite on it.¹

¹ INTERVIEW/DISCUSSION NO1 AT THE HOSPITALFILM IMG2364, A NURSE.
FORMGIVING PROCESS
PHASE 1
IDEATION SKETCHING

Researching for inspiration from magazines in Arts Craft and Architecture. The pictures are photographed. A fast process in choosing pictures. The pictures are then used as a brainstorm for concept and form ideation. Using them in both an abstract and more concrete way.
Different grades of imperfection in form

Relating to the organic form of the body. Colour gradient.
Tube is neutral with sections of form where feedback happens.

Tube connection to the machine? Organic heart shape.

Organic meets formless. Bodily form of neutral part of the tube.

Tony Craegg - organic sculpture
Protection or deteriation

Armour - protection

For being eroded - monster
FORM SEARCH

Searching for a bodily inspired form. The product is connected to the human body, explore how this could be interpreted in form language. I was sketching in warm grey coloured clay. The clay was formed both directly by my fingers and by tools. The starting point was unbiassed. I let things happen without any beforehand structure. After a session, I analysed the forms and let it guide me further in the process. Since I didn’t have a model to sketch on, I quickly sketched a clay throat.

Form meeting the throat

Connection to the trachea

INSPIRED BY A HIP JOINT - might appear to be easily moved like a rolling joint. But looks like it might be skava against the body.

CONCAVITY is too geometric. Feels sterile, stiff. industrial

ONE SPHEREISH FORM - instead of the hip joint inspired form, gives a softer expression.

The imperfection in form is a tribute to the body in purpose to connect to it better.

The concavity is to make a mark for a thumb and finger grip, when disconnecting the lid to the tracheostomy.
Tube direction from the throat
Shapes for the form connection with the throat and the tracheal tube

Here the concavity in the form is vertical. It does not play well with bodily concavities.
Why am I sketching so many spherish forms?

After sketching many sphere forms, I wondered why I kept on returning to this form when I sketched in clay. I found that it expresses lightness in the form meeting with the body.

A spherish form is chosen - as it expresses a lightness. As its area towards the body is minimal, you can even see the shadow from it. It doesn’t have so much “weight” in the form towards the throat.

The throat is the most sensitive area, and the place where machine meets body. Therefore I wanted it to have lightness.
Form direction

The angles of the forces is too attacking towards the body. It gives an expression of aggressive form.

Direction of the form that is less attacking.
Form meetings

FORM CONNECTION -
The tube form is meeting the spheres by a semi adaption. It looks like it is about to eat up the sphere forms.

TUBE ADAPTING TO THE SPHERES AT THE BODY. EXPRESSES AN OVERTAKE ON THE OTHER FORM.

FORM CONNECTION IS CALMER, MORE NEUTRAL.
From geometric to organic and formlessness

Combining geometric and organic form.

Almost geometric form of the trachea lid

Organic form of the tube

Geometric form meets formlessness with a sharp contrast.
TESTING ON PEOPLE

Proportions and textures
Old - young
Form tested in different chin positions
FORMGIVING DECISION

Imperfection in sphere concavity that plays well with the concavity of the body.

Too much concavity, but plays well with the body and the tracheostomy.
MATERIAL INVESTIGATION
Body - material meetings might be sensous or a bit revolting. It's not always easy to define what you see. It might remind us of more intimate parts even if it isn’t.
MATERIAL ON THE BODY

What materials do we use on the body? How do they feel? Wood is natural, not cold, but is hard. Hair is a natural part of the body. Textile is used on the body, it is soft. Metal is used in jewelry, but it is cold and a hard material.
Textile

Different types of textile and blala

FASHION

JEWELLERY

MEDICINE
Testing textile on clay form

Transparent and white. Allows feedback by looking into the tube. Tree inspired pattern.

Rose pattern on fabric.
Colour schemes on textile

Coluring gradients could be used as an inspiration for colour changes.
Textures

Exploring textures for an inspiration.
Knits

Knits have a soft warm comforting expression
Textile and form

This exam work from RCA has inspired me.
TACTILE EXPERIENCE

Could tactile and haptic qualities help staff and relatives to connect to the patient and contribute to a more humane treatment.

The horse’s nose is soft as velvet and it also has a haptic quality when you touch it.
Experiment with materials and 3 bodytone colours, to see if this can be part of the concept.

Bodytone colours are usually something we try to avoid, since it can be seen as repulsive.

Is it because it relates to the body and that the body is associated with lower status, compared to the mind. And that we still live in a society with dualist thinking. Is a hierarchical system.

In this hierarchical system the body and the patient has low status. Can this be addressed and challenged by letting the body colour exist and give it room. Not embrace it but by letting it have existence. It doesn’t have to be embraced either.
CONCEPT
CONTEMPORARY TUBE SYSTEM

1. Connection to the patient - Moist filter & mucus & blood collector

2. Tube to the apparatus

What kind of feedback in the form? Visual, haptical, tactile, sound inbuilt in form?
Today 3 monitors per patient

This contributes to the patient being dehumanised by the staff and relatives. Since there might be too much focus on the monitors. Staff hanging over the patient. Talking towards the monitors.

THE 3 DIFFERENT MONITORS:

1. VENTILATOR MONITOR: Gives feedback graphically and by a sound alarm system. It's situated behind the patient's head.

2. OTHER PARAMETERS, ECG, BLOODPRESSURE, etc.

3. DIGITAL JOURNAL SYSTEM MONITOR
ALARM FEEDBACK BY FORM

1. Connection to the patient- mucus and blood feedback

INTROVERTED SPHERES
Introverted shperes as form feedback. Suction form.

ORGANIC PATTERN FEEDBACK
Pattern feedback appears when mucus and blood enters the tube. Inspiration from jelly foods. Bodily resemblances. Fluids in the filter tube.
Pattern that appears when mucus and blood enters the tube.

GRAPHICAL FEEDBACK.

SPHERE FORMS POP OUTS - AS MUCUS FEEDBACK

Pop out spheres. Convexity, growing form, plays with the event, fluids coming out.
2. Tube to the apparatus - feedback on 4 parameters

- Feedback No 2: Top Pressure
- Feedback No 3: Breathing Pace
- Feedback No 4
- Feedback No 5
Textile in motion

One concept idea was to have a tube in fabric with layers of semi-transparent organza inspired material that is moving with the breathing. If there are some problems, the movement of the fabric would change and get uneven in movement to catch attention.
Expanding / Contracting form

Expanding and contracting form to feedback low and high parameters, working as an alarmsystem inbuilt into the tube form to enable a closer contact to the patient.

Wires as protection. Expanding and contracting form.
OTHER IDEAS

Writing on tube as if it was a cast

The idea was that relatives could write on the tube and leave messages, as they would on a cast when someone has broken a bone.

But testing the idea on others, gave me insights that the tube feels too fragile, and you don't want to write on it. It is a sensitive matter. It wouldn't feel respectful to write on it.
FORM DECISIONS

I decided to use the Mucus form feedback and the feedback by contracting and expanded form as part of the tube concept. This is to be developed in the formgiving phase 2.
FORMGIVING PROCESS
PHASE 2
SEARCHING FOR BODILY FORM

What is bodily form?

How do I define bodily form. I did an investigation of what characterises bodily form.

BODY MARKS

Inspiration from works by second year ID students Andreas Bergström and Gavin Engel at Konstfack, Spring 2011

Subtle body marks in the form.
ORGANIC : CONVEXITIES - CONCAVI-
Convexitiea and concavities mimics the bodily form.
FORMLESS

Formlessness is closer to the inner bodily form, like intestines or bodily waste, like faces, puke.
IMPERFECTIONS

The body is not perfect in its shape like geometric forms. The body can have geometric like shapes, but with imperfections.
WORKSHOP

From clay to wax method

Form experimenting with clay and wax. Gives a softer finish of the form. The clay models are formed with the hands, using warm clay. When using tools, it's hard to form a bodily form. When the clay has hardened, it was dipped in wax. The wax was used with different temperatures. A warm temperature gives a more fluid wax and provides a thinner coating. Colder wax forms quicker, but tends to get too thick and the wax makes drips in the form.

I started out with clay forms. I was using warm clay, that were formed by the naked hand, without any tools, to get a bodily form.

I was using warm wax to experiment with form. The clay form was dipped several times, giving a wax surface. It softens both the form and the surface of the original clay form.
Before wax

CLAYFORM

After wax

WAXED FORM
Throat connection form

BODY MARK - CONCAVITY IN FORM

I found a form with a subtle concavity, that was a result of a body mark, that I’ve chosen as a form for the form meeting with the throat. It needs to be altered in proportions and form to fit the throat better.
Sketching throat form in clay. Testing the connection with the rest of the tube form.

I LIKE!

Chosen throat connection form in clay
I was experimenting with wax to get a softer finish in the form.
I like the organic shape that meets the other tube. But it competes with form feedback forms.

The in between tube forms are too thin and skeleton like

Too thick. Not enough flow.

This form has a broken form. Stops the flow.

This form is cute. I like it. But it doesn’t fit the gestalt and the expression I’m after. No flow.
Throat form decision

The chosen throat form. It has a subtle flow. It feels light. It has a subtle organic expression and a body mark. It fits to the rest of the gestalt.

I LIKE!
Colouring connection tube

I was testing three body colours on this tube form. A brown, pink and a beige colour. In my material research I was inspired by colour gradients. The idea is also to use the colours for semiotic feedback to easily see where it belongs in its connection both to the trachea connection and the tube connection.

Current solution. Cylinder form. This one has an added inbuilt closed suction system.

The gradient in colour shows that brows on pink that the pink connects to the brown form and the white connects to a white tube, so you can learn that colours meet same colours in the connections.
The alternative tube is here quickly sketched into the environment.

It’s placed on the white sheets. The tube blends in well. It is subtle but still visible. It’s important to remember that it has a haptical feedback as well as a motion in form when the alarm goes off.

Sketching the gestalt. The tube position is wrong, The position is more like on the picture on top.
BODILY COLOUR OPTIONS

I have chosen to have three body colours, to be part of representing body in the chosen form. It's also the tube that is connected directly to the body. I was discussing with different people on which colour combination I should choose. Some people thought that the brown colour was to contrasting to the olive coloured body of the doll, that they connected it to faces. I didn’t find that problematic since faces is bodily form. The order of colour could be seen as the hierarchy of the colours politically, therefore I rather have brown than beige as the first colour, to question racism. Also it would be difficult to dip the colours with brown in the middle, since it’s a dark colour. Another strong thought was that the pink colour should be first, since everybody are pink inside. The gradient in colours also shows that the colours blend well.

I wanted to visualise the connections by colour semiotically. Pink connects to pink . White connects to white.
WAX COLOURING

I was testing colouring the tube form by colouring wax with oil colour. It was hard to blend the colour, and the dipping ended in a lost form, since the wax changes the form. It's not easy to predict the end result, so even if the initial form is changed to take in account that it will build, it's hard to control the result.
FEEDBACK IN FORM

Mucus feedback

When mucus or blood from the lungs are entering the throat tube, some spherish forms pops up to show that it needs to be changed. When its only a little bit of mucus it only pops up in the first part of the tube, later it pops up in the second part. The third part, the white one, is the filter. It's therfore white and it doesn't feedback on mucus by pop up spherish forms.
Expanding and contracting form feedback

NEUTRAL FORM

What makes it neutral? It has organic/formless qualities, but is not tense in the form nor loose. Calm

EXPANDING FORM

What caracterises the expanding form? It has more tension in the form. It can have different directions of the tension. It blows up a little bit like a balloon. I wanted to keep some organic feel to the form, therefore it has some wrinkles in the form.

CONTRACTED FORM

The contracted form, can be described as the opposite to the expanded form. It has lost a lot of its tension. The form has stared to hang loose, which gives wrinkles to the form.
Testing tube form feedback

The chosen forms are alarm feedback on four different parameters, like top pressure, breathing pace, etc.

Neutral form = normal values, no alarm

Expanded form = high values

Contracted form = low values.

The alarm is turned off by gently pressing the form with the hand. The haptic feedback has a softness and the tactility in form is soft to appeal for a more humane contact.

The alarm parameters are in the same order as on the monitor. Counting from the wall towards the patient.

Testing the different feedback forms; expanded, neutral and contracted form.
Tube position

Sketching the direction of the tube and testing proportions. The tube I used to sketch with was rather stiff.

From this view the direction resembles the aspired direction better in a curved form from the throat and towards the machine that is situated behind the bed at the head end side.

Especially this part is not resembling the direction so well.
Form decision for tube feedback

EXPANDED, CONTRACTED & NEUTRALFORM

Neutral, contracted, expanded, and contracted forms in clay.

The chosen clay forms after they have been dipped in warm wax. From left to right: contracted, contracted, neutral and expanded form.

I LIKE!
BUILDING THE FINAL MODEL

WORKSHOP METHOD

Creating casting forms for the 4 tube feedback forms.

Clay underneath. a wood stick to keep it from the ground. A clay piece on top to create the hole to pour the silicone.

Metal sheet as a guard. thread

vaseline on the metal. not needed on the clay/wx form.

24 hour hardener in this cast.
Casting form feedback

Cast is ready.
Casting of the tube. It was done by using an existing tube form and casting the inside of it. The result wasn’t perfection, there were some air bubbles in the form and some problems with the lining.
Acryl crystal casting and colouring of the throat connection form

Acryl crystal had an advantage that it hardens in just two hours. It’s not a complete hardening, but you can take it out of the form. A quicker sketch method than for example silicone.

Testing to see if it was possible to colour acryl crystal and then dipping in wax. It was possible to do this, but the result wasn’t admirable.
PIGMENT COLOURING IN ACRYSTAL

I decided to colour the acrystal instead.

The result was an inbuilt runny colouring together with sharp lines. I wasn’t sure how to deal with the result at first, but I liked the runny form since it has connections to the bodily fluids inside the form.
Pigment colouring silicone

I decided to move on to cast in silicone. Silicone is softer, it has a haptic quality that resembles body. Acrystal is cold and hard. Silicone is warmer. It takes longer to harden, you can choose between 6 to 24 hours. For the throat tube form I chose to work with 6 hours hardener. Another advantage with silicone is that it would be easier to attach to the other tube forms I already had casted in silicone.
The chosen colour. It has a lot of pink that appears to be running from the throat form. The pink colour can be seen as a metaphor for the inner flesh colour that all people have. The colour covers and unites both the brown and the beige skin colour.

My original semiotic idea of colour meeting colour still applies, pink meets pink and white meets white.
Colour decision

Testing on a person.
There is a difference between the colouring of the front and the back. The back side shows more clearly the skin tone colours, with quite sharp edges. While on the front the pink colour is running over the other colours. I think that is preferable. It is something you can discover with time if you are observant.
The only glue you can use is silicone based. Nothing else sticks to silicone. I used the same hardener plus something called Tixo. Tixo makes the silicone very thick, and it hardens faster, but you still have to wait for 6 hours. You put pins into the forms to keep them together.

I had to re-do this 3 times. There were holes in the model, and part that didn’t stick. When this happened the second time, there was no glue in the workshop. And the workshop teacher would be away for a week. I could get in touch with anyone to help me. Since the model hand in deadline was next day, I decided to try and glue solely with silicone. This didn’t work!

The last day I tried to get hold of the glue and I made a last try. Because of the tight schedule and due to that I had stomach flue the result was very messy. To get a good result you need time to do the gluing in several steps. Waiting 6 hours to let it harden to continue with the next step, and to avoid getting silicone glue on everything. I did try to cover the forms with plastic, but it did not stick well and made it difficult to work.
I wanted to see if the tube with the chosen feedback forms could benefit to have an inbuilt product graphic interface. I found that the added graphic interface spoiled the form expression and the thought behind function in form. It's better to keep the graphical interface on the monitor.
**Tube materials**

I decided to skip the previous idea of using fabric on the model. I still think it might be a good idea, and I think it could be something to research further in another project. There are some hygiene aspects that needs to be solved, but the involved parts are one-offs and changed as soon as they get dirty so this is not necessarily a problem, so this is not the reason for not choosing this solution.
A VISION OF AN ALTERNATIVE VENTILATOR

I LIKE!
ALARM WITH A HAPTIC AND TACTILE INTERFACE

The idea of a haptic and tactile interface alarm for the ventilator is to shift focus from monitors to the patient.

Outcomes from the interviews and observations was that many patients, staff and relatives felt that the patients risk a loss of humanity in ventilator treatment.

Nurses were telling me that they thought that it was important to have focus on the patient and practice based knowledge about the patient and skin tone, type of breathing, and other important information, that might be lost in high technology medical discourse.
The inbuilt alarm in the tube is designed to function as a complement to the monitor alarm. To reduce stressful sound alarm. Instead of having two separate monitors with alarms, the ventilator alarm is integrated to the other monitor to keep all alarm parameters in one place.
Form feedback alarm

Two Alarm Modes

- **HIGH** = Expanded Form
- **LOW** = Contracted Form
- **NO ALARM** = Neutral Form
Purpose is to focus on the patient - not the monitors
Turning off the alarm with tactile & haptic qualities in the interface

The nurse is turning off the alarm.

By gently squeezing on the form that's alarming.
Soft haptical and tactile feedback. Like a nose of a horse.

Alarms are turned off. There are normal values of the four different parameters, oxygen, Peak pressure, etc.
Mucus feedback

When mucus enters the tube, bumps appear in the form to indicate that it is in two stages on the form. Here shows stage 1.

In Stage 2, the bumps are spreading to the next part of the form.

Change this part of the tube.
To open the lid to the tracheostomy

Change this part of the tube.
CHANGING PRIORITIES BY MAKING THE TUBE CENTRAL

My aim has been to investigate what happens to the gestalt when applying discourses related to the medical ventilator to the design process, rather than just following the norm in medical design. One of the central outcomes of the project is that the explorative aesthetic approach made possible a discourse shift from the technical part of the product, to the patient related part, the tube. The ventilator tube is what connects the patient to the technical part of the machine, and this part of the product has been neglected before in medical design.

I tried to understand why the tube is not seen as an important part of the product in medical design. The ventilator tube is de facto an essential part of the machine, because without the tube, there is no ventilator treatment. Gender theory about work division and hierarchy of gender in hospitals uncovers that technical related care has high status, while patient related care has low status. This theory also applies to the medical ventilator. The tube, that connects to the patient and is mostly handled by low status staff has low status, while the technical part of the apparatus has high status.

The effect gender power hierarchies has on medical design is alarming, according to my findings. We should question that patients have low status in medical design and in health care. This is something that needs to be investigated and explored further.

BODILY FORM & CHALLENGING CONSTRUCTED DICHOTOMIES

Medical design can be accused of following norm. By this I mean that instead of letting the discourses related to the medical ventilator be part of the design process, medical design discourse follows a norm of product gestalt that is argued to express what’s “medical”. Inviting other discourses related to the medical ventilator the formgiving process allowed for bodily form, including formlessness into the gestalt.

By experimenting with colouring silicone poured into a casted form, an unexpected result was allowed. The initial idea of three bodily colours was further developed thanks to this workshop experimenting/exploration. The dripping form in colours, gives a hint of what’s inside; ie mucus and blood that comes from the body. It tells the story of the origins of this product. This design decision can be seen as being arbitrary, which has provoked some people. It’s important to make clear that the decision is not arbitrary, although the inspiration to the decision is. Interestingly this design choice, resulted in discussions which uncovered that some people weren’t aware that mucus can come up from the lungs into the tube. It is an example how design can act as an implicit pedagogic tool, as long as we allow for discussions.

The greyish white colour on the tube, is the colour of the silicone. My intention was to have pure white colour on the form feedback tube form. I was disappointed when i discovered that i was misinformed about the silicone colour. But when I tested the final result with the white bed-linen I realised that the greyish white colour might be a better option after all, since it allows the product to both blend into the context and to stand out a little. The white colouring is something that could benefit from further investigation. The original idea with pure white, was that it will show when it’s dirty and it calms the organic form. White is a colour of spirit which I wanted to meet with the bodily form, intellect and body united.

The plain tube form is kept between the organic and formless form parts of the tube. It combines the sterile part of the aesthetics with an organic, bodily inspired part, that may be connected to the dirty parts in the environment. My intention is to let them exist side to side, and that this leads to a view that they blend in together instead of seeing them as a dichotomy. The organic parts of the tube are closer to the patient while the machine inspired tube is closer to the machine, ending with an organic form connection with the machine. For further investigation I would suggest to test other form solutions for the “straight” tube part of the ventilator. How will a subtle irregularity and distortion in the form affect the gestalt?

What does it mean to give bodily form to this product? Can it contribute to make the patient feel human again, by claiming some parts of the machine? When is the machine a monster? The parts of the tube that remains like the original tube, although in a new softer and opaque materia, could that be the part that reminds us that the machine is forceful, andthat it is difficult to say no to treatment if you are in a state where you can’t talk for yourself anymore.
MATERIAL, TACTILITY & THE HAPTICAL

Another area of further investigation that is important is the exploration of possible material solutions for the medical ventilator tube. A special area of interest is textiles.

My project solution includes a haptic and tactile interface. This is something that needs to be investigated further in physical models, so it can be tested. Can haptic and motion feedback help staff and relatives treating the patient in a way that s/he doesn’t feel a lost of humanity? How would staff and relatives experience a form based haptic and tactile interface?

IMPLICIT FUNCTIONS

An important question for the medical field, is the role of more implicit functions, and how they could be fruitful in this field? Could subtlety enhance other important qualities as emotional engagement and attachment to the patient?

By using tactility in a soft surface that may resemble a soft baby head or a nose of a horse, I wanted to reach to inner emotional parts of persons. I wanted to use the idea that many people get affected by tactility. One person I talked to, who tested the final model, said that it felt more humane, that he liked the way it felt. It was nice to touch. Could this support patients that aren’t sedated in a helpful way?

FORMGIVING DISCOURSE

Instead of just following normative discourse in medical design, we should be problematising the norm. One way of doing so is by including criticality in the design process, and by doing so, reclaiming the value of design as something more than a marketing tool or a technical construction. This way we allow design take an active and important part in the societal debate.
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Kotronias, Sotiris Focus on Detail, Project report / MA Interaction Design / Umeå Institute of Design


OFFICIAL PUBLICATIONS


NEWSPAPER ARTICLES


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FILM

Dokumentärfilm: “Konsumtionsvecka: Köpgalna barn”, SVT, 2010, tor 13 jan, from: http://svtplay.se/t/103478/dokumentarfilm 2010-01-12 The quote is modified as a mix between the swedish texted translation and her verbal quote.
APPENDIX
## PROJECT PLAN

### NOVEMBER
- **18 NOV** Hand in Project Plan. 1 printed issue to Teo 15:00 in s6
- **22 NOV** Presentation Project Plan

### DECEMBER
- **7 DEC KL 10:00-10:45** Individual pres Anna Stern
- **10, 11, 12 DEC** Work MIVA, 21-07:30 SÖS (Test with materials and texture)
- **14-15 DEC** Presentation Research and Concepts
- **15 DEC** FILMING testings, interviews
- **16 DEC** Hand in Research Report, 2 printed issues and PDF
- **16 DEC** Work MIVA

### JANUARY
- **12 JAN** Comments in the PDF from Teo and Shared crit
- **24 JAN** Tutoring with Teo 13:15

### RESEARCH

Research: PRESTUDY (medical ventilator and discourses surrounding the product; breathing, life-death, greyzone, etc. Ethics and Aesthetics, MATERIALS textures, haptics, INTERVIEWS, reading)

### FORM PROCESS

FORM process. (test textures) , sketch in 3D materials

### MODELMAKING

MODEL MAKING

### REPORT & PRESENTATION

REPORT & PRESENTATION
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<td>5 APRIL Hand in presentation</td>
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<td>em handledn m Beatrice Brovia</td>
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**SKETCH MODELS** in clay, textile and other materials

**FINALモデル in SILICONE**

**BUILD EXHIBITION**

**FINAL EXAM**

**MAY EXHIBITION REPORT**
INTERVIEW/DISCUSSION NO1:
Scary breathing noise. Associated with Darth Vader. A living organism - something human - and at the same time not. Knows about brain death. It is a medical definition and it is permanent death. Are you body or mind?.

INTERVIEW/DISCUSSION NO2:
We don't think we will die - but be cured. How much money is used for the design? To turn off the ventilator; Discrepancy with rational thought and emotional feeling when relatives makes the decision. Films with ventilator: Hitchcock and a film with Christoffer Reeves. “Butterfly in the jar”.

INTERVIEW/DISCUSSION NO 3
To diagnose brain death 3 steps: 1. DT angio in the brain. To see if there is any circulation in the brain. 2. breathing. is determined by CO2, therefore the ventilator is turned off and the CO2 curve is followed. If under a certain level the drive is not prevalent which means that you won't be able to breath again permanently. 3. neurological testings. To determine an permanent absence of neurological functioning.

Thanx to the brain death definition, the amount of kidney transplants has risen.

Ventilator: “Att hamna i en respirator är det värsta som kan hända.” Something you take very seriously. See the ventilator as an aid, as a last resort to save life. The treatment has many side effects: complications such as pneumonia, muscle deterioration, muskeltvisting pga man vänjer sig vid apparaten.

This is due to that you get more shallow breathing, and you are unconscious or sedated so you can't cough. It's called VAP Ventilator associated pneumonia.Corsodyl, chlorhexidin is helping to prevent this since it kills bacteria. A closed sucking system also helps preventing VAP, and 30 degree angle of the bed.

The nose on the trach, is named after the nose, since it works in a similar name. The nose filters and has other advantages.

Tracheotomy: So the patient can be awake. Then you can breath by yourself a little bit. To trigger breathing, with aids deeper breaths? In the 50s trach but no skydd, helt öppet, ledde till ÖLI.

What is the most fun? Intubering. It is acute. Crisis. It's exciting. And if you do it well and succeed well with it. Adrenalin kick.

The tube is changed every 6 days. Important with no leakage and that i doesn't attract bacteria.

When braindead it is not the relatives making the decision about turning the machine off.

The nervous system can't control the heart the same way as the lungs. When you are brain dead, the lungs and the breathing cease to work. the hear can continue beating for a long time, but you are dead and wont be able to breath anymore.

At the ICU the ventilator is used mostly for lung conditions. At Ear/nose and Throat department it is used for patients with tumours.

Has a lot of respect for the ventilator and the tubes.on guard. Nothing is allowed to go wrong.

Trach trays. The tracheotomy hole can't be left without tube, then the patient can't breath since the hole closes.

To use the ventilator the patient must have a treatable condition. KOL patients might have a hard time coming off the ventilator, resulting in a life long treatment.

PROBLEMS:
The måttutrustningen doesn't always show the exact pressure you have in the lungs. It only shows what the apparatus gives.

1. INTERVIEW/DISCUSSION NO1: a student, Own translation
2. INTERVIEW/DISCUSSION NO2: a student, Own translation
WISHES:
A tube that connects the artery gas to the machine, showing real time concentrations.

APPARATUS:
Siemens Maquet, a swedish brand. Or a Dräger.³

INTERVIEW/DISCUSSION NO 4
Grandmother in a ventilator, the informant was thinking. “I hope she gets to die” Has a notion of the ventilator as a “big chuck with lots of tubes”. It is greyish white, like an old computer. To keep someone alive is not always positive. It depends on the situation and the person and the illness. Ventilator treatment is forced upon. To loose bodily control. Someone/something is breathing for you. It is positive to get a chance to survive, but it also is scary.

The ventilator is increasing the stres among the relatives, but also for the patient. What you meet as a relative, the apparatus can seem more frightening than it actually is.

The smell gives the strongest impression.⁴

INTERVIEW/DISCUSSION NO5:
You are connected to a machine and therefore not a real person anymore. It is very negative. It is scary not to be able to move. A permanent condition. A huge handicap to carry around a big chunk. You lose humanity.

Are you aware of brain death?
I don’t know so much about it. Is it possible to resuscitate the brain as with the heart?⁵

INTERVIEW/DISCUSSION NO6:
I’m wondering how it feels for the doctors to intubate a patient. The body; that one only thinks about it when it becomes a problem. The ventilator as an aid for the body.

Breathing. That the ventilator is closely connected to the sound of breathing. The informant tells me about a patient that was lying awake in a ventilator, and how she felt that the medical staff didn’t treat her as a person anymore.

We don’t talk about death. Ventilator and TV series. That it is acute, crisis. That death has become an illness we are trying to prevent and cure. That we don’t think we will die. That it is avoidable.

Are you familiar with brain death?
Not completely. But we aren’t dead until the brain is dead.

They are wondering how the doctors looks upon this.⁶

INTERVIEW/DISCUSSION NO7:
When working at the hospital: Asked questions to the doctors when they had their round. One of the doctors had changed the parameters of the ventilator, and it’s quite a procedure. He had to stretch himself over the patient (sedated) and in an unergonoical position change the parameters.

I asked if the ventilator could be placed differently? And what they thought of the current position. One said that it was perfect, since it can be viewed easily by the staff. And you don’t change the parameters so often.

INTERVIEW/DISCUSSION NO8:(At hospital: 1 ssk)
A nurse I talked to talked about the absurdity when informing relatives about that their relative is dead, and then they see their mum appear to be breathing, due to the ventilator.

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³ INTERVIEW/DISCUSSION NO3: hospital staff - a doctor. Own translation
⁴ INTERVIEW/DISCUSSION NO4: a student. Own translation
⁵ INTERVIEW/DISCUSSION NO5: academic professional, Own translation
⁶ INTERVIEW/DISCUSSION NO6: a student. Own translation
INTERVIEW/DISCUSSION NO9 (anteckningar)(1usk):


INTERVIEW/DISCUSSION NO10 (på sjukhuset 3 ssk, 1 usk): (röstmemo45)

Berättar vad jag jobbar med. Hur tänker ni på det här att apparaten kan vara ett monster eller en livräddare? Tänker ni på det?

-Nå, inte respiratorn.
-Men om ngn som stannar idé?
-(en annan person) - men det finns ju dom som är långliggare. Som man inte kan träna ur respiratorn.

(jag) Men det var ju en kvinna som ville ha den avstängd. Om man ser att en patient ser plågad ut. Om man ser att den här patienten mår nog inte så bra.

-Läkarna har rätt av avryta en meningös livsuppehållande behandling.

-jag ser på den som ett hjälpmedel, men sen om den skulle bli till ondo eller ett lidande för patienten, jag har inte den kopplingen att den är en ond sak.

-(jag) men det är ändå negativt? hur tänker du då?

-lång paus. (jag) tänker du att det inte är maskinens fel?

-ja precis!

-det var bra uttryckt!

-man kan inte skylja på maskinen.

-i så fall är det ju något hos patienten som gör att han/hon inte klarar sig utan den hjälp den som du kan få via respiratorn. Att det blir ett beroende som man inte kan bli av med.

-(jag) så om man ligger där utan att komma ur den...?

- men det är ändå ett hjälpmedel, den underlättar ju.

-(jag) men den förlänger ju livet, som inte är något liv då?

-(jag fortsätter) men inte är så bra också, man är död men ändå inte?

-Jo det har du rätt i.

-(jag) man kanske inte vill tänka så mycket på det?

-inte jag i alla fall.

-nä.

-det är ju inte så att man tänker; jävia respirator!

-vi tänker ju inte; typ nu slänger vi ut den! det finns andra apparater vi hellre slänger ut!

-(jag) men det här att man sitter och kollar på siffor, hur skulle det bli om att det skulle vara ngt i formen, istället för siffor, som gör att man kan se att det är ngn ändring?

-?

-(jag) att det är något som växer eller,

-fast måtvärdena är ju i siffor och då vill man nog ha dem i siffor.man måste kunna värdera den där stolpen. utifrån någotning, tex ett topptryck; då måste man ju veta...

-vad är normalt värde.

-vad står stolpen för och hur hög och hur låg ska den vara för att det ska vara normalt eller optimalt. Då är det ju lättare.
med en siffra. Den säger ju direkt, hur det är.

(jag) men är det alltid så exakt med siffran då? det kanske inte alltid är det?
-siffran är ju exakt.

(å) men jag menar att man kanske kan se ändå. att siffrvärdet inte är ..
-jo jag tycker nog att siffran är viktig.

-dan ger ju mycket information, hur andningen och maskinen fungerar.

(jag) finns det inte en risk att man glömmer bort personen och att det blir för mycket fokus på siffrorna?
-Men det är nog en nybörjargrej tror jag.

-jå.


- Det gör ju gärna det när man är ny, då kanske man går direkt till droppstolpen, kollar blodtrycket och glömmer bort att titta på patienten.

- Det är lått att man fokuserar mycket på apparaterna, speciellt i en sån här miljö, när det är så mycket apparater. Om man inte är van att jobba med apparater, sån här teknik, intensivvård som det är. Där är det lått att man fokuserar på maskinerna.

-jag Men de tar ju lite tid oxå maskinerna?
-De tar inte så mycket tid.

-Nå.

-Bara det fungerar så.

-Man vet ju vad man ska titta på. Då räcker det att man slänger ett öga på dem.

(jag) Så ni tycker inte att det är ett jättestort problem?
-Nå
-Nå.

(jag) Men vad tycker ni är problem? Om ni har tänkt på om det är något man skulle kunna ändra på?
-Just respirator eller?

(jag) Eller något annat. Det är en maskin som sitterihop med patienten.
-lång tystnad.
- Jag kommer inte på något.
-Man är för van.
- Ja, jag tror att det är så.


(jag) Och det är ganska trångt som det är.

-Det är ju det.

INTERVIEW/DISCUSSION NO11 (på sjukhuset: 3ssk,1usk): (röstmemo46)


-Jag tänker inte på det överhuvudtaget. jag ser den som ett hjälpmedel till patienten.

-Vi har ju haft patienter som aldrig kommer ur. Då kan den bli ett monster.

(jag) hur känns det då?
- det känns ju för jävligt.

(jag) för att man är maktlös?


(jag) Men det kan ju vara svårt att veta innan. Hur tar man det beslutet?

-Ofta är de intuberade redan från ambulansen. Du kan man känna suck. 90 åring multisjuk.

- Det händer inte så ofta att det blir så där men det händer ju. Att patienter inte kommer ur respiratorn.


-Men det skulle nog inte vara så bra.

(jag) För att?

-För att det skulle förstärka den känslan. man försöker ju göra så gott man kan.

-Sen tror jag att de situationerna då det är i slutet, har man då en maskin som ser lite halvkonstig ut, så skulle ju anhöriga definitivt reagera stenhårt. Det finns anhöriga som hamnar i chocktillsstånd, som inte kan ta in det vi står och säger, när det är i livets slutskede. och skulle då en maskin som ser ännu värre ut, så skulle det bli en ännu värre situation för dom.

-jag men om maskinen visar att patienten inte mår bra? inte att den ser ut som ett monster men att man ser att den här personen mår nog inte så bra?

-Jag tror att det är viktigt att man, om det finns anhöriga, att de får tid att smålta in. Bara för att den visar att patienten inte mår bra, men det ser vi ju rätt tidigt successivt.

- Eller menar du psykiskt?

(jag) Båda delarna kanske. Tänk om det skulle bli så att det finns en stor avstångningsknapp som stängs av automatiskt.

- Men det får man inte.

(jag) Nå men det var så att man fick.

- Men det kommer nog aldrig att bli så i Sverige, för vi får ju inte stänga av dem.

(jag) Nå, men det är ju inte så mycket diskussion kring det heller.
-Det är svårt att få folk att donera organ. Och det är svårt att få folk att om det. Hjärndödsbegreppet är fortfarande rätt så laddat.

(jag) Det är inte alla som vet att vi har det. Det upptäckte jag i mina intervjuer och en del tror inte på det heller.

-Man pratar inte så mycket om det i Sverige.

-Det är ett väldigt känsligt ämne.

-Det är många som inte har sett någon död person, innan någon väldigt nära har gått bort.

INTERVIEW/DISCUSSION NO12 (på sjukhuset 2 läk 1 läk stud.): (röstmemo49)

(jag) Tänker ni i siffror eller har ni någon visuell bild kring siffrorna?

-Vi tänker delvis siffror, men man tänker mycket fysiologi.

(jag) Kan du se det i bilder?

-Man kan ju sätta på compliance, det går ju

(jag) Men ser du det i huvudet också?

-Jag tittar på kurvorna. så den bilden ser jag. Topptrycket tex speglar eg trycket i tuben inte trycket i lungvävnaden. Så jag blir inte så rädd om topptrycket ligger på 40, för eg ska man mäta platåtrycket och då kan man mäta topptrycket i alveolen.

(jag) Hur viktigt är själva siffran?

-Relativt oviktigt.

(jag) så man skulle kunna visualisera det i produkten som någonting annat?

- Jag vill nog ha en siffra.

(jag) Men tänk om det var något som blir större och mindre i formen och att man lär sig vad det betyder.

-Ja, men siffran är ju ändå en siffra.

(jag) Men vad är en siffra egentligen?

- Det är ju som att kolla på hjärtfrekvens tex. Det är inte bara intressant att veta om den är större eller mindre. jag vill veta om du har 100 eller 200 i hjärtfrekvens.

(jag) Men kan man inte ha det i formen, så att när det är 100, så ser man det.

INTERVIEW/DISCUSSION NO14 (på sjukhuset1 usk.): (röstmemo51)

(jag) Du sa att du tittar inte så mycket på displayen?

- Om det larmar tittar jag efter vad det är för något.

(jag) Vad tittar du på då? Siffror grafen?

- Jag tittar på varför den larmar. Där uppe står det i gult eller rött om det är högt tryck eller lågt tryck eller andningsfrekvens eller vad det är.

(jag) Och hur använder du den informationen?


(jag) Har du någon hjälp av siffrorna tec topptrycket?

-Nej, för jag kollar på patienten.

(jag) Tycker du att det alltid syns? Och gör det det då de är sövda?

-Inte alltid. men ofta kan man höra hur de andas.

(jag) Hur hör du det?

-De blir mer ansträngda, flälsiga. och många gånger kan de andas emot respen.

(jag) Hur låter det då?

-Det är svårt att förklara.

(jag) och då agerar du efter det istället.

-precis

(jag) Läkaren sa att han tittar på graferna?

- Det tittar jag inte på. (bestämt) Det är läkarnas.

- ja ibland önskar man att man kunde sänka det. Men man kan inte det.

(jag) Varför inte?

-För att man ska höra det om man inte är där. Alla Ivor funkar inte så att personalen sitter där hela tiden. men det är störande för patienten också. Ligger de och hostar mycket kan det larma ofta och det kan störa mycket, för patienten och om det ligger 2 på salen sånggrannen.

(jag) man kanske blir stressad av ljudet som patient och att man väcks av larmet.

- ja det är ju natt, det blir problematiskt om man inte får sova då. Dom är redan i en annan värld för att de är så pass sjuka. och att sen ligga och höra alla ljud.

(jag) Hur tänker du på respiratorn som livräddare eller monster tänker du på det?

- Nä. Det är ju medicinering då, det är läkarna som bestämmer.

(då är man ju maktlös inför det, hur känns det?)

-Ja, det är ju inte alltid kul och se en patient som inte trivs.

(jag) Har du tänkt något kring den här gråzonen som skapas pga respiratorn?

-jag tror inte att de flesta tänker på det.

(jag) Kände du till hjärndödsbegreppet innan du började jobba här?

- Nä, inte innan.

(jag) Funkar alltid diagnosen, ställs den alltid korrekt?

-Man gör så mycket undersökningar innan man uttalar att det är så.

- Det är läkarna som tar beslutet att avsluta respiratorbehandlingen vid hjärndöd. Men man kan ju vänta lite så att anhöriga blir redo.

- Ibland blir det så att en patient får respiratorbehandling, fast de inte borde ha fått det. Tex KOL patienter , som kan vara svåra att få ur respiratorn. De som är gravt sjuka i sin KOL.

(jag) Försöker man undvika att sätta in respirator behandling till KOL patienter?

-Man måste ju kolla hur långt i sin KOL de har kommit.

-Respiratorn kan användas som en avlastande behandling också. Tex vid pneumonier, då patienten kan ha svårt att andas.

INTERVIEW/DISCUSSION NO15 (på ett fik: 2ssk): (röstmemo41)

- ...hur det än är, så är det en ständig påminnelse om monstret (vi talar om tracheostomi.) Det som jag tycker är så otäcks med folk som har varit ”trachade”; man kan ju se att de har ett ärr, som ständigt sitter där som en bodymark för resten av livet.

(jag)Men vad skulle ni tycka var mest intressant?

- Jag tror att en trach, är ett större ingrepp i ens liv än att bara ha varit intuberad. Att bli trachad är ett större trauma, för då har du varit 16 timmar i ena sängen och alltid har du varit intuberad, men att bli trachad är ett speciellt ärr, det kommer alltid att finnas kvar, för att då har du varit nersövd och borta någon vecka.

(jag) Men kan det vara något positivt också? att man har kommit igenom det?

-Nää.

(jag) -Det är negativt?
- Jag tror det, det beror ju på hur man vänder det själv.

(jag) Men du tänker att det är negativt.

- Ja, för det är något man måste processa sen, tror jag.

(jag) Och när blir den ett monster?

- när du har blivit trachad.

INTERVIEW/DISCUSSION NO16 (på sjukhus: 1ssk.): (film DCN2362 tid 03:03:30)

(jag) Det där vi pratade om förut, respiratorn som livräddare eller monstret , vi pratade om det en gång förut. Hur tänker du kring det?


(jag) Vad kan hända då?

- Att anhöriga inte förstår....blir avbrutna..

(fortsätter med film DCN2363 tid 03:03:30)

- Om man är med. Så ser man ju om patienten dör. På EKG, blodtryck och andra parametrar. Och för anhöriga som inte förstår, ofta är det så, så blir det konstigt om det visar sig att patienten är död, men det ser ut som om patienten andas och det kan finnas någon rörelse på ekg. (jag) Vad kan hända då?

(jag) När tycker du att maskinen blir ett monster, är det bara då eller kan det även vara när någon blir långliggare men inte kommer att klara sig?

- Då ser jag det mer som en livräddare.

(jag) Jo men om patienten inte har någon livskvalitet?

- Jo men så många patienter har vi inte.

(jag) men i somras var det ju någon som låg väldigt länge och som inte verkade må så bra psykiskt av det.


(jag) För att hon inte ville (leva).

- precis. Men i en sån situation vet man ju inte om patienten är helt klar i huvudet alla gånger. Men det kan man ju nästan tänka sig att hon var. Då var det nog väldigt mycket monster.

(jag) Men hur kände du då?

- Ja, vad gör man, man kan ju inte, man måste ju sätta tillbaka slangen, för annars dödar ju vi patienten. Det blir ju så.

(jag) Och hur känns det?

- Man kan ju tycka att om man ska få bestämma själv. man får ju bestämma delvis, men då ska det ju, det är oftast tidigt i vårdförlippet man kan vara med och bestämma. som patient.
INTERVIEW/DISCUSSION NO17 (på sjukhuset, en ssk. Skriftliga anteckningar.)


INTERVIEW/DISCUSSION NO18 (på sjukhuset, en ssk, skriftliga anteckningar.)


OBSERVATIONS:
A lot of focus on the monitors, especially during doctor rounds.

The graphs no:s might be hard to see from a distance.